patients aged ≥ 70 years. On multivariate analysis for cOS, no advantage for PMRT was detected (HR: 1.084; 95% CI:0.986-1.191, p=0.095). Variables favouring the use of postoperative radiotherapy on multivariate logistic regression analysis included young age (p<0.001), large tumour size (pT3/4) (p<0.001), positive resection margin (p<0.001), and positive nodal status (p<0.001). High-risk patients with≥ 4 positive lymph nodes who underwent mastectomy in 1998-2012 had a significant increased likelihood of receiving PMRT (OR 6.245) as compared to patients treated in the early period of analysis, from 1988-1997 (OR 2.837).

Conclusion: The present study was useful in providing a window on the adoption of PMRT in a large population-based cohort, and to determine trends over time, as well as to characterize and quantify the outcome in clinical practice. A significant shift in indications for PMRT was registered, especially for high-risk patients with≥ 4 positive lymph nodes. Moreover, the present findings track a substantial variation and apparent underuse of PMRT within the vulnerable population of elderly patients aged ≥ 80 years.

OC-0050

Variations in use of hypofractionation for early, node-negative breast cancer in NSW 2007-2012

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Purpose or Objective: Phase III randomised controlled trials and subsequent evidence-based treatment guidelines suggest that breast hypofractionation has low toxicity and similar cancer outcomes compared to patients undergoing standard fractionation. However, uptake of hypofractionation has not been universal. The aim of this study was to investigate the uptake of hypofractionation regimens in all public radiation oncology facilities in NSW.

Material and Methods: Data from the NSW Clinical Cancer Registry were extracted, cleaned and verified. The inclusion criteria included those patients that are node negative breast cancer (TNM stage I or IIA), year of diagnosis between 2007 to 2012, year of treatment between 2008 and 2012 and received external beam radiotherapy in a public radiotherapy facility. Data extracted included dose and fractionation type, patient age at first fraction, distance from treatment facility, year of diagnosis, year of treatment, laterality of treatment and department of treatment. In this analysis, standard fractionation was defined as dose per fraction of between 1.8 – 2.4 Gy per fraction and hypofractionation as above 2.4 Gy per fraction. Univariate and multivariate analyses were performed to assess which factors predict for hypofractionation use.

Results: Of the 6066 early breast cancer patients fulfilling the study criteria, 3947 patients (65%) had standard fractionation and 2119 patients (35%) received hypofractionation in 14 public radiotherapy centres in NSW. There was a wide spread of fractionation used across departments ranging from 6% to 92%. Hypofractionation use exceeded 50% in only 4 departments. Statistically significant factors to predict for hypofractionation use were increasing patient age, right sided breast cancer, further distance from home to the treating facility, more recent treatment, facility and clinician treating.

Conclusion: While hypofractionation has become more common across NSW, there remains a substantial proportion of patients for whom hypofractionation would be considered appropriate who are not receiving hypofractionation. This has also been found to be the case in US studies, although we believe we are the first to identify laterality as an indicator. Understanding factors that may predict standard fractionation use might assist in developing strategies to address the issue. Hypofractionation for early breast cancer being adopted more widely would lead to greater patient convenience, better resource efficiencies in radiation oncology departments and perhaps even increase the use of post-lumpectomy radiotherapy, as some patients might currently forego radiotherapy due to the perceived inconvenience of standardly fractionated radiotherapy.

OC-0051

Variability in lymph node delineation for breast cancer radiotherapy: an AIRO multicenter study

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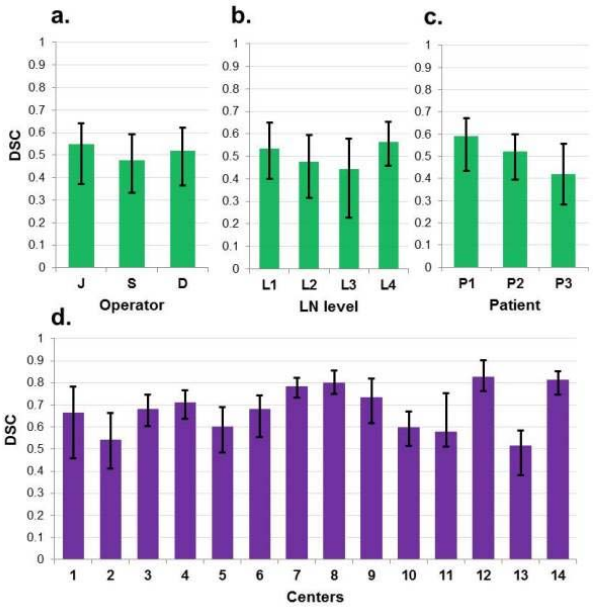
Purpose or Objective: To investigate inter-operator and inter-center variability in lymph node (LN) volume delineations in breast cancer (BC) nodal irradiation.

Material and Methods: The study was conducted by the Italian Society of Radiation Oncologists (AIRO) - Breast Cancer Working Group. For each center, 3 radiation oncologists (ROs) with different expertise were involved: 1 junior (J), 1 senior (S) not dedicated to BC, and 1 senior (E) expert in BC. The CT series of 3 patients at different levels of complexity were selected: 1 with simple anatomy (P1), 1 obese (P2) and 1 with impaired arm mobility (P3). ROs were asked to contour axillary nodes, as follows: I level (L1), II level (L2) and III level, the latter was further divided into infra (L3) and supraclavicular (L4) nodes on CT images by applying guidelines on breast contouring released by AIRO. The inter-category and the inter-center variability were investigated, by evaluating the variability in volume size, structure overlap (measured as Dice similarity coefficient, DSC), and average Hausdorff distance (AHD) between contours.

Results: Thirty-nine ROs from 14 centres participated and 468 contours were obtained. Firstly, the analysis was focused on volume size. By comparing the operators, E-ROs contoured slightly larger volumes than S-ROs and J-ROs, with no statistically significant differences. Conversely, statistically significant differences were found in volume size when stratifying for patients (larger volumes were obtained for P2) and for LN levels (in order of size: L1, L4, L2, L3 – L1 being the largest and L3 the smallest). Secondly, descriptive and statistical intra-group analysis showed that all the 3 principal factors (different expertise, LN level and patient) contributed to inter-operator variability. When analysing DSC, poor agreement was found among ROs stratified for expertise (Fig. 1a) and the differences between S-ROs and the other groups were statistically significant. Considering the LN levels (Fig. 1b), the highest concordance was found in the contouring of L1 and L4 levels and the lowest for L3 (p<0.05). Moreover, inter-operator consistency dramatically decreased as patient complexity increased (Fig. 1c). Consistent results were found in the analysis of AHD. Finally, considering the inter-center variability, statistically significant differences were found in 38.5% of comparisons when considering intra-center median DSC (Fig. 1d) and in 33% of comparisons when considering intra-center median AHD.



		L1		L2		L3		L4	
		mean	st.dev.	mean	st.dev.	mean	st.dev.	mean	st.dev.
J	P1	62.8	15.7	20.1	4.7	9.1	3.1	30.3	8.7
	P2	89.6	34.8	31.4	12.3	17.0	6.5	37.7	9.8
	P3	39.3	16.6	24.0	9.5	12.2	6.6	22.2	10.3
S	P1	65.1	28.4	18.0	3.0	12.4	5.6	35.3	16.8
	P2	87.1	49.1	30.7	12.2	21.8	8.2	42.9	21.7
	P3	41.4	22.8	26.4	11.6	16.1	10.5	23.8	12.6
E	P1	70.4	35.8	17.7	5.3	11.5	7.0	32.4	6.8
	P2	116.2	67.3	32.6	10.6	22.5	11.5	39.0	9.0
	P3	48.6	21.2	22.2	5.8	16.3	12.6	23.0	7.7

Conclusion: Guidelines for regional LN did not significantly improve the consistency of contouring among ROs. The J-ROs were the most accurate in contouring according to AIRO guidelines and showed the highest level of homogeneity, while the S-ROs followed the guidelines to a lesser extent, probably because of higher self-confidence.

OC-0052

Long-term age dependent failure pattern after BCT vs. mastectomy in low-risk breast cancer patients

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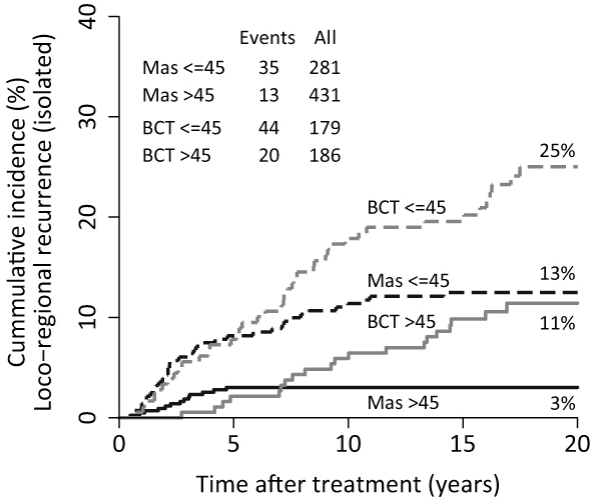
Purpose or Objective: Optimal local treatment for young women with early-stage breast cancer remains controversial because of the lack of knowledge as to whether local recurrence (LR) can be the site of metastatic disease. The aim was to describe the age depending LR pattern as a function of time (0-20 years) and local treatment, given as either Breast conserving therapy (BCT) or mastectomy alone. Furthermore to test, if LR was associated with an excess risk of distant metastasis (DM) and translate into a higher mortality after BCT.

Material and Methods: 1077 Danish patients were enrolled in this population-based cohort study. The patients were diagnosed in the period from 1989 to 1998, classified as low-risk (lymph-node negative, tumor size <5 cm), treated with mastectomy (N= 712) or BCT (N=364) and received no systemic treatment. The cohort included all Danish low-risk patients below 41 years (N = 305) and patients from one part of Denmark. Patient identification, treatment, and 20-year recurrence data were ascertained from the DBCG.

Results: After 20 years the cum incidence of LR was 18 % after BCT (N=66) and 6.7% after mastectomy (N=55). The LR pattern of failure was different depending on age: young (≤45 year) vs. old (<45 year) and treatment: BCT vs. mastectomy. The older mastectomy patients developed only very early LR (< 5 year), young mastectomy patients developed early LR (0-10 year), and BCTpatients despite age developed LR throughout the 20-year period (Fig 1). Among young patients, the BCT group had a higher risk of LR after 20 years compared to the mastectomy, RD = 13% (4.8-20), and LR was a prognostic marker for DM, HR =2.0 (1.3-3.1). The 20-year mortality among the young patients was significantly higher after BCT compared to mastectomy: Breast cancer death, HR =1.6 (1.0-2.5) and Death, HR =1.7 (1.1-2.6). Among the older patients, LR was not a prognostic marker for DM after 20 years, HR: 0.9 (0.3-2.2), and local treatment was not associated with Breast cancer death, HR =0.8 (0.5-1.2).



At risk					
Mas <=45	281	219	191	146	57
Mas >45	431	339	271	187	43
BCT <=45	179	140	110	84	32
BCT >45	186	157	128	89	23

Conclusion: In the group of patients treated with mastectomy all LR occured within the first 10 years. In contrast, BCT patients developed LR throughout the period and had a significantly higher cumulative incidence of LR at 20 years. Within the young patients LR was associated with DM, and BCT was associated with a significantly higher mortality. Among older patients LR was not a prognostic marker for DM and there was no difference in Breast cancer mortality between the two treatment groups.

OC-0053

Re- irradiation for locally recurrent breast cancer

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Purpose or Objective: To report an analysis of treatment outcomes and toxicity of a cohort of patients re- irradiated after a second breast conserving surgery or no further surgery.

Material and Methods: Between 11/05 and 10/15, 32 women were re- irradiated with 50- 60 Gy for locally recurrent breast cancer. The first RT course included postoperative radiotherapy with a total dose of 50 Gy in 25 or 50,4Gy in 28 fractions followed by a boost dose to the tumor bed according to risk factors in 81.3%. In 18.7% supraclavicular nodes were treated with 50Gy.The median age at first diagnosis was 53.3 years (range 36- 69.7). 78.1% of the women were postmenopausal. 81.25% of the tumors were pathologically classified as T1, 12.5% as T2 and 6.25% as